DOCUMENT RESUME

ED 167 187 IR 007 186

AUTHOR Kendrick, Bryce
TITLE An Application of Computerized Instructional Television in Biology.
PUB DATE 6 Apr 78
NOTE 7p.; Paper presented at the Symposium on CCMIT (Waterloo, Ontario, Canada, April 6, 1978); For entire proceedings, see IR 007 104

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Audiovisual Aids; *Biology Instruction; *Computer Assisted Instruction; Educational Strategies; Educational Television; *Higher Education; Individualized Instruction; Instructional Design; *Learning Modules; Teaching Methods
IDENTIFIERS *Computerized Multimedia Instructional Television

ABSTRACT

Computerized instructional television was used to teach undergraduate students about 100,000 or more extant fungi through an interactive, self testing, teaching program. Students did not find this sophisticated hardware an adequate substitute for the lecture experience and ultimately gave their professor a strong vote of confidence. (Author/JEG)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED167187

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

AN APPLICATION OF COMPUTERIZED INSTRUCTIONAL TELEVISION IN BIOLOGY

by

Bryce Kendrick

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Bryce Kendrick

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

IR007186

AN APPLICATION OF COMPUTERIZED INSTRUCTIONAL TELEVISION IN BIOLOGY

by

Bryce Kendrick

Professor

Department of Biology

Abstract: The Fungi (like so many other groups of living organisms) are very unfamiliar to most undergraduates, and any course introducing students to the 100,000 or more extant fungi is immeasurably assisted and enriched by a variety of visual aids, particularly colour transparencies of macroscopic and microscopic phenomena. Computerized instructional television incorporated these into an interactive, self-testing teaching programme. However, students did not find even this sophisticated hardware an adequate substitute for the lecture experience and, much to the relief of their real, live professor, ultimately gave him a strong vote of confidence.

As a biologist who has always entertained a friendly curiosity about computers, I have on many occasions approached these strange creatures closely, and have sometimes succumbed to the siren songs of their keepers. Let us, they croon seductively, take care of all your chores. Let us free you to pursue your creative trains of thought. Trains that are so often derailed by the sheer oppressive tedium of storing, retrieving and sorting data; inevitable accompaniments as these processes are to so much scientific research.

It has not escaped me that, having fallen for the advertising, I have usually been transformed from a freewheeling biologist into a slave of the numbers, feeding the insatiable machine its approved diet. The promised freedom soon assumes a new guise -- that of a very small light at the end of a very long tunnel.

Despite repeated disillusionments of this nature, which thoroughly convinced me that computer inputting devices left much to be desired, I persisted in my attempts to establish communication with the C.P.U. At various times I have dabbled in numerical taxonomy, interactive computer graphics identification keys, computer simulation of biological processes, and establishment of an extensive biogeographic databank.

When COMIT was announced, it occurred to me that the computer owed me a favour after all the support and employment I had given it over the years. Computer-assisted teaching! Here was my opportunity to get some long-delayed return on my investment. The picture looked very rosy: colour television with a sonic pen facility as part of a flexible, interactive teaching programme. With a mixture of fascination and trepidation, I agreed to take part. I elected to use COMIT to introduce my students to a very numerous and diverse group of fungi, the Ascomycetes. These organisms are doubtless as unfamiliar to most of my readers as they were to my second year students when they entered course Biology 232 (Fungi and non-vascular plants). One of the major difficulties I encounter in teaching this course is that the students have almost no idea what most of these organisms look like or how they operate. One of my principal aims is to remove that particular roadblock. To this end I make liberal use of visual aids such as colour transparencies and movies. Figures 1-4 show the kind of thing I mean. Most rotten tree trunks have Ascomycetes fruiting on them, but how many people would recognize the very characteristic fruiting bodies of these fungi? Fig. 1 (actually a scanning electronmicrograph) shows what the perithecia of one wood-inhabiting Ascomycete look like under the dissecting microscope. Note their almost spherical shape and the short beak through which they expel their spores. Fig. 2 shows what you see if you mount a ripe perithecium on a glass microscope slide and squash it under a coverslip. The spores are held in rows of eight by a thin, colourless sheath which is the ascus -- the microscopic structure from which the Ascomycetes get their name. Fig. 3 shows a good collection of one of the most delicious edible fungi, the morel, which happens to be an Ascomycete. Figure 4 shows the unique appearance of a tiny bit of the inside of a truffle -- the gourmet's delight -- another Ascomycete. Here I can point out that the ascus is more or less spherical and contains only 1, 2, or 3 ascospores, which have a thick, ornamented wall. This helps them withstand passage through the gut of mammals which detect ripe truffles by their odour, dig them up and eat them, and subsequently void the spores elsewhere. By means of one of the best of all baits -- olfactory and gastronomic pleasure -- the fungus has used the mammal as a means of dispersing its ascospores.

I hope these few examples have convinced you of the great importance of visual aids to the teaching of mycology. COMIT promised to make this material available in an automated, interactive system.

After some initial planning sessions, during which the aims of my segment were enunciated, we began to build the framework. I found that many diagrams I usually draw on the blackboard had to be produced as colour transparencies for COMIT. This was a plus, because I was subsequently able to use some of these diagrams in a correspondence version of Biology 232. But I soon became horrified by the massive investment of time which the production of this segment was obviously going to entail. I did not keep a record of the hours I spent on it, but I know their number was excessive. The parallel investment of time on the part of the COMIT programmer was, I know, larger by an order of magnitude than my own. After a protracted period of development during which innumerable changes and corrections had to be made, the system became operational, at least in theory. Another problem surfaced at this point. The computer had to be programmed to cope with all possible incorrect answers, as well as with essentially correct answers which had been misspelled. This called for additional hours of programming and consultations. After a further extended period of fine-tuning, it became possible to sit at the console and run through the module.

I had originally requested that a sound-track be incorporated in the module. I didn't press the matter too hard, and in the event, the sound track did not materialize.

I regretted this omission, because I believe that the information I try to present is better accepted when received by more than one of the senses. The mycology module in its final form was entirely visual. The students have to stare at a T/V screen, at very close range, for an hour or more. This probably bothered them far less than it did me, since they have been exposed to T/V from birth.

Because of certain unavoidable delays in putting the final touches to the COMIT module, the topic had already been covered in the regular lecture format when the time came for 20 volunteers from among the one hundred second year students to do the modules. I announced that there would be a class test on the topic the following week. This gave non-COMIT students a chance to revise the topic from their regular text and other materials.

The test showed that although scores of the students taking the COMIT module were, on average, slightly higher than those of the rest of the class, the difference was not significant.

I asked for written comments from the COMIT students. Since the COMIT module was a new toy, I was not quite sure how these comments would reflect on my regular presentations. I need not have worried. Their general tenor was reassuring. Many students claimed to have enjoyed the module, and to have found it a good method of revising material, but most of them also insisted that it could not replace the normal lectures.

But perhaps I should let the students speak for themselves. Here are some representative comments:

"... an excellent attempt at using sophisticated technology as a teaching aid ..." "... it was very well organized ..." "I look forward to using teaching aids of this sort (and this quality) in the future ..." "... you were able to go at your own speed ..." "... served as an excellent review ..." "... I intend to use the computer as a way to review for the exam ..." "... it was very effective in reinforcing the basic characteristics of the Ascomycetes due to the immediacy of interacting with the computer, and the thoughtful manner in which the segment was organized and illustrated..." "As a supplement to lectures it was worthwhile. It helped to clarify and condense the lecture material.... It was a good idea to involve the students in answering questions: since I was receiving immediate feedback, I felt like I was getting personal attention .. but if there was something I didn't understand, I couldn't ask the computer to explain. The slides were good, although not as clear as when projected..." "... You were unable to return to a previous part of the module if you found you had not grasped the concept fully..." "Even with the questions the computer is much like reading a text-book..." "... Perhaps if a sound track had been provided, it would have helped..." "... the lack of an audio stimulus made it perhaps a little boring..." "...Though the computer method was interesting enough, I felt I preferred the lectures and slides..." "... The programme was very impersonal ... the colours on the screen were often very bright, and after reading it for two hours your eyes became very tired ... lectures are preferable..." "... A good professor brings a lot more to a course than this pro-

gramme did. He brings interesting anecdotes, vitality, living proof that somebody really studies all this stuff, as well as a lot of humanism that the computer didn't have...."

My own feelings after the experiment can be expressed as follows:

(1) I now realize very clearly that it would be enormously expensive in hardware, software and labour, for computer instruction to replace even one professor for one course.

(2) Perhaps even more importantly, there is still no substitute for the human element in teaching. A good professor can communicate enthusiasm in a way that any computer would find difficult to emulate. In addition, the professor can immediately handle all kinds of red herrings, offbeat but interesting questions and backtrackings, and he can respond to the mood of a class or individual in a more flexible way than is possible even for the most elaborately programmed machine. (This is not to say that he always does!)

My general conclusion is that computer assisted instruction can be a useful additional resource, but that it is not yet time for the professor to quit the classroom forever. Only internal motivation can make a student learn and retain information and ideas. I believe he is still most likely to contract that motivation from another human being.